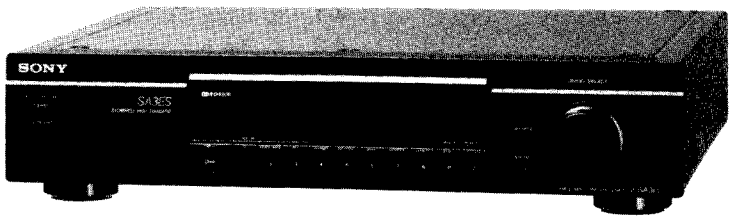
# ST-SA3ES

# SERVICE MANUAL

*AEP Model*




## SPECIFICATIONS

### FM tuner section

| | |
|---|---|
| **Frequency range** | 87.5 - 108.0 MHz |
| **Antenna terminals** | 75 ohms, unbalanced |
| **Intermediate frequency** | 10.7 MHz |
| **Sensitivity** | at 26 dB quieting (mono) 10.3 dBf, 0.9 µV/75Ω<br>at 46 dB quieting (stereo) 38.5 dBf, 23 µV/75Ω |
| **Usable sensitivity (IHF)** | 10.3 dBf, 0.9 µV/75Ω |
| **S/N** | at 40 kHz deviation<br>80 dB (mono),<br>76 dB (stereo) |
| **Harmonic distortion** | WIDE<br>0.02% (mono),<br>0.03 % (stereo)<br>NARROW<br>0.05% (mono),<br>0.07 % (stereo) |
| **Frequency response** | 15 Hz - 15 kHz<br>(+0.2/–0.5 dB) |
| **Separation** | 60 dB at 1 kHz |
| **Selectivity** | at 400 kHz<br>WIDE 80 dB<br>NARROW 90 dB<br><br>at 300 kHz<br>WIDE 45 dB<br>NARROW 70 dB |
| **Output** | at 40 kHz deviation<br>600 mV |

### AM tuner section

| | |
|---|---|
| **Frequency range** | MW: 531 - 1,602 kHz<br>(9 kHz step)<br>LW: 153 - 279 kHz<br>(1 kHz step) |
| **Intermediate frequency** | 450 kHz |
| **Usable Sensitivity** | (with AM loop aerial)<br>MW: 200 µV/m<br>LW: 700 µV/m |
| **Signal-to-noise ratio** | MW: 54 dB<br>(50 mV/m,<br>999 kHz)<br>LW: 50 dB<br>(50 mV/m,<br>216 kHz) |

— Continued on next page —

MICROFILM

## FM STEREO FM/AM TUNER

SONY®

| | |
|---|---|
| **Harmonic distortion** | 0.3% (50 mV/m, 400 Hz) |
| **Selectivity** | 50 dB |

### General

| | |
|---|---|
| **Power requirements** | 220-230 V, AC 50/60 Hz |
| **Power consumption** | 13 W |
| **Input impedance** | 75 ohms |
| **Input connector** | IEC-male |
| **Dimensions** | 430 x 98 x 340 mm |
| **Weight** | 4.5 kg |
| **Supplied accessories** | Audio cord (1)<br>AM loop aerial (1)<br>FM wire aerial (1) |

Design and specifications are subject to change without notice.

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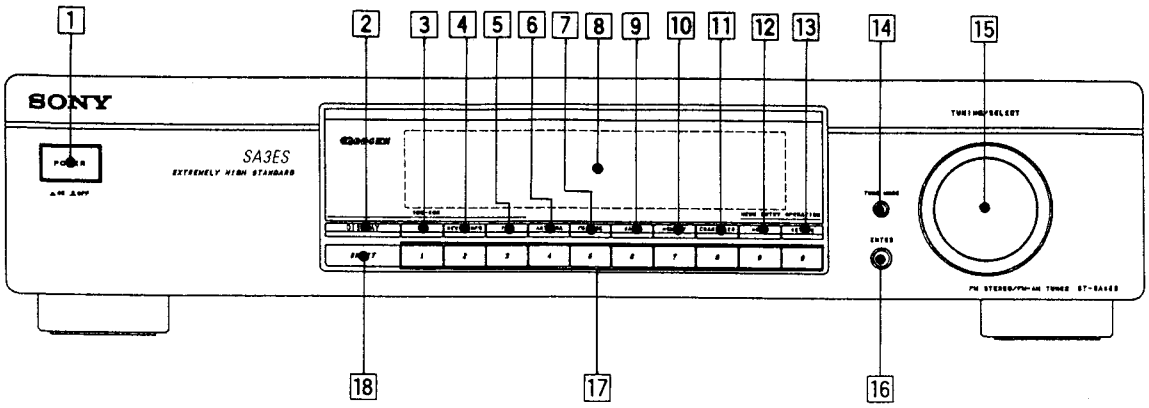
**SAFETY-RELATED COMPONENT WARNING !!**

**COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.**

# SECTION 1
# GENERAL

## Front Panel




1 POWER switch
2 DISPLAY button
3 TA button
4 NEWS/INFO button
5 PTY button
6 ANTENNA button
7 FM MODE button
8 Display window
9 BAND button
10 MEMORY button
11 CHARACTER button
12 MENU button
13 RETURN button
14 TUNE MODE button
15 TUNING/SELECT knob
16 ENTER button
17 Preset buttons
18 SHIFT button

# SECTION 3
# TEST MODE

## 1. Circuit Check Mode

Set to the reception frequency that the circuit can STEREO RDS stations. (Set the input level to above 70 dB.)

1. Turn OFF the power.
2. While pressing [4] and [MENU] together, turn ON [POWER].

• The items in the following table will be checked automatically in order every 2 seconds.

| Display | Items | DISPLAY | | NG |
|---|---|---|---|---|
| | | FM RDS | AM (MW, LW) | |
| Tuned | $\overline{\text{AST}}$ signal =LOW | OK or NG | | IC251 NG, RV251 adjustments |
| IF Frq | IF COUNT OK | OK or NG | OK or NG | FE101, IC251 NG, or IF count buffer amp (Q251, Q401) NG |
| Sig Level | SI LEVEL≧70dB | OK or NG | OK or NG | IC221 NG, RV221 adjustments |
| Stereo | $\overline{\text{ST}}$ signal=LOW | OK or NG | | IC301 NG, RV301 adjustments |
| RDS Signal | RDS DATA OK | OK or NG | | IC801 NG |

**NOTE : The preset data will be erased when this test mode is used. Therefore, take down the data before setting this mode and preset the data again after completing operations in this mode.**

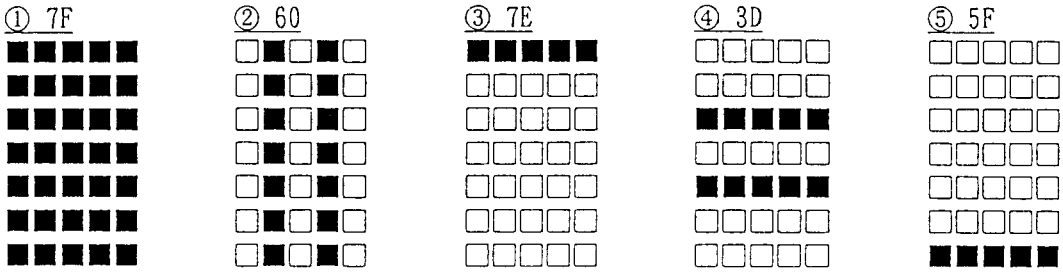
## 2. Display Tube Check and KEY Check mode

**NOTE :** Do not perform this check mode when replacing display tubes or excepting when replacing a microcomputer.

1. Turn OFF the power.
2. While pressing [1] and [MENU] together, turn ON [POWER].
3. While continuously pressing [1] and [MENU] together, check the following.

Microcomputer version indication (1 sec)→ All light up "7F" → Dot erea only "60" → Dot erea only "7E" ↓ Dot erea only "3D" ← Dot erea only "5F" ↑

Indication test pattern




* The indication test patterns from ② to ⑤ are indicated on only even grids.

The display changes every 1 sec.

4. Release [1] and [MENU]. The KEY CHECK mode will be set.

5. All key numbers will be displayed.
   Key Number : 24

6. Each time the key is pressed, the key number will be counted down.
   Each key will be counted only once, at the first time.

7. When all keys have been pressed, the process will end.

**NOTE :** As contents of the Factory Preset will be written into memory after completing this check mode, delete contents of memory according to 4. Forced RESET.

## 3. Entering the Factory Preset (In case perform just to write memory of the Factory Preset.)

1. Turn OFF the power.
2. While pressing [3] and [MENU] together, turn ON [POWER].

## 4. Forced RESET (Used to delete the contents of Factory Preset when it is written into the preset memory.)

Clears all the RAMs and sets the initial state

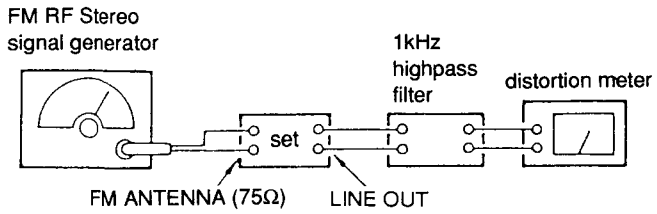
1. Turn OFF the power.
2. While pressing [5] and [MENU] together, turn ON [POWER].

# SECTION 3
# ELECTRICAL ADJUSTMENTS

### Precautions in Repairing

If the front end unit fails, it is difficult to repair the inner circuits, so replace the entire front end unit.

**FM SECTION** | 0dB = 1μV




• Standard Setting of FM Stereo RF Signal Generator.

| STEREO STANDARD SIGNAL | MONAURAL STANDARD SIGNAL |
|---|---|
| Carrier frequency : 98MHz<br>Modulation : Audio 1kHz<br>Main channel (L+R) : 33.75kHz deviation<br>Sub channel (L–R) : 33.75kHz deviation<br>Pilot : 7.5kHz deviation | Carrier frequency : 98MHz<br>Modulation : Audio 1kHz 75kHz deviation |

### How to switch IF BAND WIDE/NARROW

**Method 1 :**

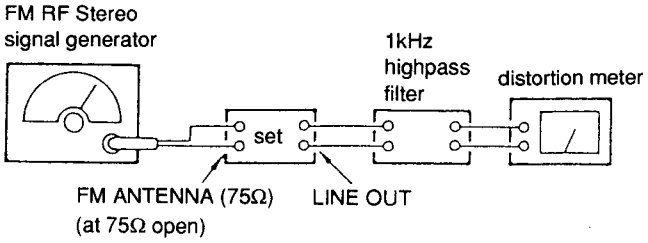
1. Push the MENU key and turn the TUNING/SELECT to indicate "Reception" on the fluorescent display tube, then press the ENTER key.
2. Turn the TUNING/SELECT to indicate "ATT/IF Band" on the fluorescent display tube, then press the ENTER key.
3. Turn the TUNING/SELECT to indicate "ANT ATT: OFF" on the fluorescent display tube, then press the ENTER key.
4. Turn the TUNING/SELECT to indicate "IF: NARROW" or "IF: WIDE" on the fluorescent display tube, then press the ENTER key.
   When the IF BAND: NARROW is set, "NARROW" is indicated on the fluorescent display tube.
5. Set WIDE after the operation.

**Method 2 :**

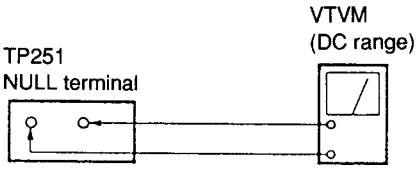
After the test modes "2. Display Tube Check and KEY Check mode" or "3. Entering the Factory Preset", "IF : NARROW" and "IF : WIDE" are switched every time pressing [RETURN] key.
This function does not work if the power is turned off once.
Set "WIDE" after the all adjustments.

### FM Discriminator ADJUSTMENT (NULL and MONO Distortion Adjustment)

**Setting :**
IF BAND : WIDE




Modulation : Monaural Standard signal
Output level : 6mV (76dBμ)



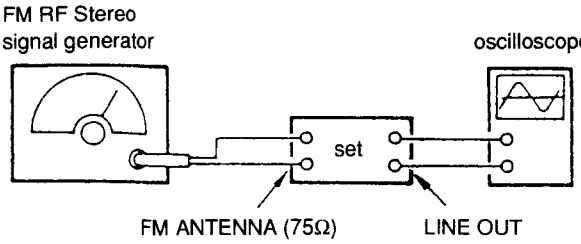

**Procedure :**

1. Tune the set to 98 MHz.
2. Adjust T252 for 0V reading on the VTVM.
   ..... NULL
3. Adjust T253 for a minimum reading on the distortion meter.
   ..... MONO Distortion
4. Repeat the adjustments of 2 and 3 several times.

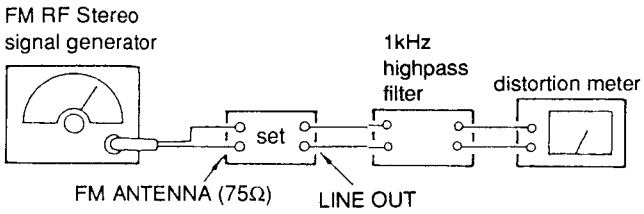
**Note :** When replacing the ceramic filter, perform this alignment.

### Front End IFT/STEREO Distortion Rate Adjustment

**Setting :**
IF BAND : WIDE




Modulation : Monaural Standard signal
Output level : 2.2μV (7dBμ) (at 75Ω open)



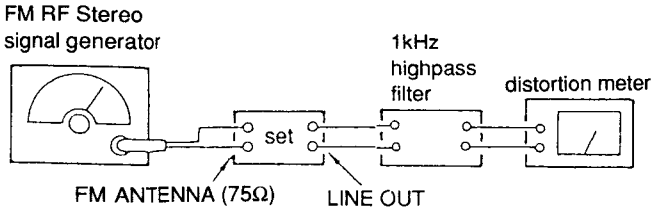

Modulation : Stereo Standard signal
Output level : 6mV (76dBμ) (at 75Ω open)

**Procedure :**
1. Tune the set to 98 MHz.
2. Remove the top cover of the front end (FE101).
3. Adjust IFT1 of the front end (FE101) to put the noise up-and-down and symmetrically on the waveform of the oscilloscope.
4. Adjust the front end (FE101) IFT1 to minimize the STEREO distortion rate.
5. Attach the removed top cover of the front end (FE101) as it was.

**Note :** Do not turn more than a half turn from the core position which is adjusted on the front end IFT adjustment.

### Narrow THD Adjustment

**Setting :**
IF BAND : NARROW

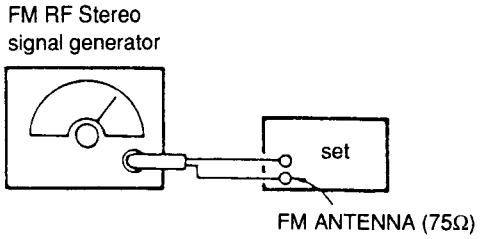



Modulation : Stereo Standard signal
Output level : 10mV (80dBμ) (at 75Ω open)

**Procedure :**
1. Tune the set to 98 MHz.
2. Set "IF BAND : NARROW" according to the procedure of "How to switch IF BAND WIDE/NARROW" on page 6.
3. Set SSG output level to 80dBμ.
4. Adjust RV232 for a minimum reading on the distortion meter.

### Stereo Level Adjustment

**Setting :**
IF BAND : WIDE

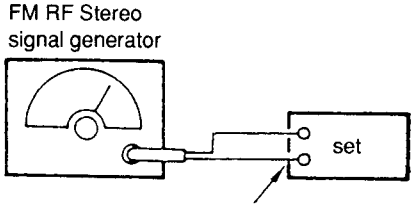



Modulation : Stereo Standard signal
Output level : 32μV (30dB) (at 75Ω open)

**Procedure :**
1. Tune the set to 98 MHz.
2. Adjust RV251 so that the "STEREO" indicator goes on.

### Narrow Gain Adjustment

**Setting :**
IF BAND : NARROW

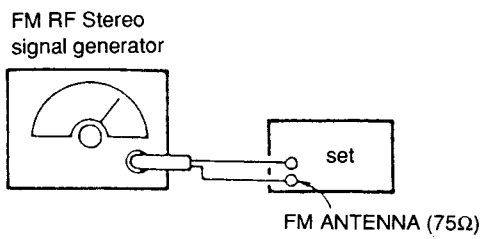



Modulation : Stereo Standard signal
Output level : 32μV (30dB) (at 75Ω open)

**Procedure :**
1. Tune the set to 98 MHz.
2. Set "IF BAND : NARROW" according to the procedure of "How to switch IF BAND WIDE/NARROW" on page 6.
3. Adjust RV231 so that the "STEREO" indicator goes on.

### FM Meter Level Adjustment

**Setting :**
IF BAND : WIDE

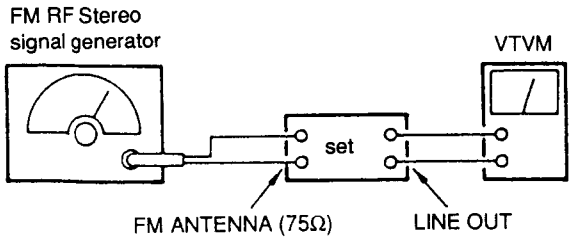



Modulation : Stereo Standard signal
Output level : 3mV (76dBμ) (at 75Ω open)

**Procedure :**
1. Tune the set to 98 MHz.
2. Press [DISPLAY] key to display the digital signal, then adjust RV221 to be displayed as "SIG 70dB".

## Stereo Separation Adjustment

**Setting :**
IF BAND : NARROW (NARROW SEPARATION)
WIDE (WIDE SEPARATION)




Modulation : Stereo Standard signal
Output level : 6mV (76dBμ) (at 75Ω open)

**Procedure :**
1. Refer to "How to switch IF BAND WIDE/NARROW" on page 6.

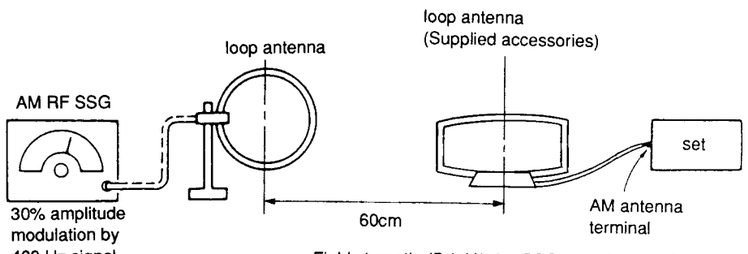
| FM stereo Signal generator Output channel | VTVM connection | VTVM reading (dB) |
|---|---|---|
| L-CH | L-CH | Ⓐ |
| R-CH | L-CH | Ⓑ<br>IF BAND WIDE :<br>Adjust RV301 for minimum reading on VTVM<br>IF BAND NARROW :<br>Adjust RV302 for minimum reading on VTVM |
| R-CH | R-CH | Ⓒ |
| L-CH | R-CH | Ⓓ<br>IF BAND WIDE :<br>Adjust RV301 for minimum reading on VTVM<br>IF BAND NARROW :<br>Adjust RV302 for minimum reading on VTVM |

L-CH Stereo separation : Ⓐ − Ⓑ
R-CH Stereo separation : Ⓒ − Ⓓ

The separations of both channels should be equal.

## AM SECTION

**Setting :**
BAND : LW



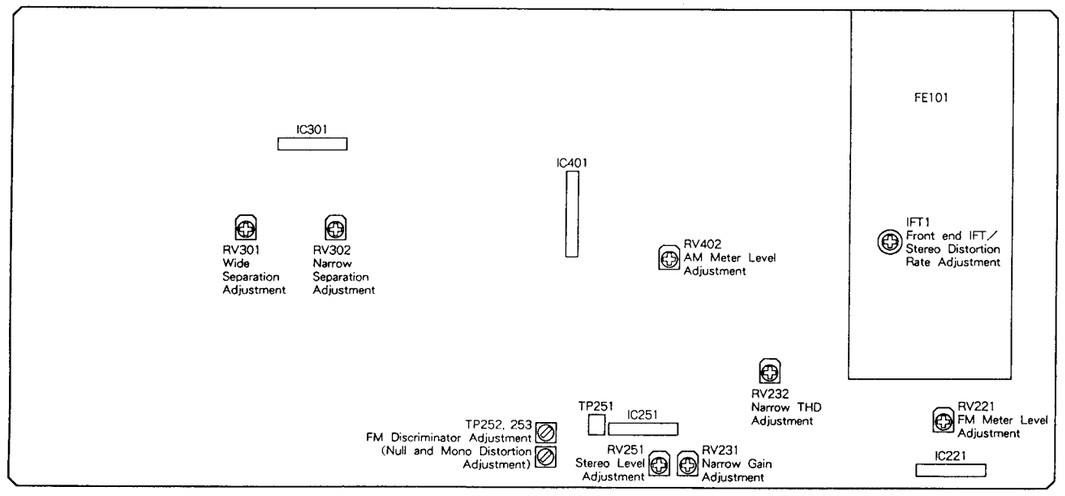

Field strength dB (μV/m) = SSG output level dB (μV/m) –26dB.

### AM Meter Level Adjustment

**Setting :**
Carrier frequency : 216kHz
Modulation : 400Hz, 30% modulation

**Procedure :**
1. Set AM RF signal generator so that the AM antenna input level becomes 74dBμ/m.
2. Adjust RV402 so that 1 to 10 indication bars light up on the signal meter.

**Adjustment Location :**

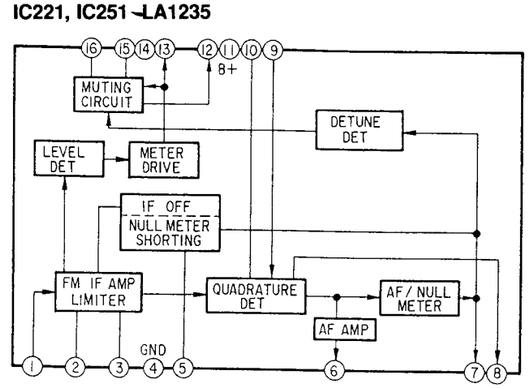




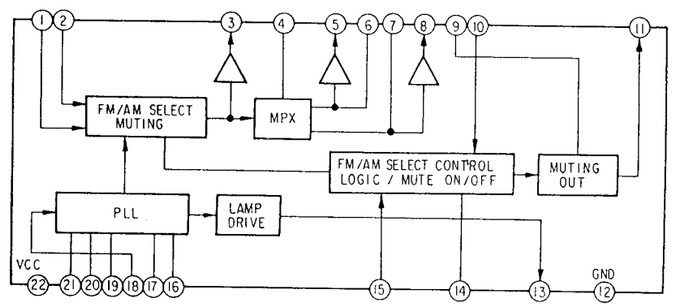

# SECTION 4
# DIAGRAMS

## 4-1. IC BLOCK DIAGRAMS

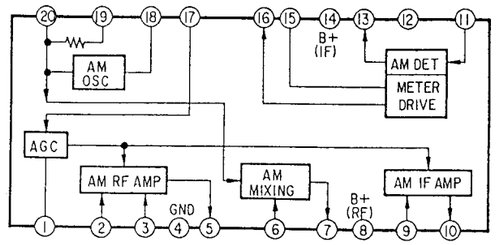
### IC221, IC251 LA1235



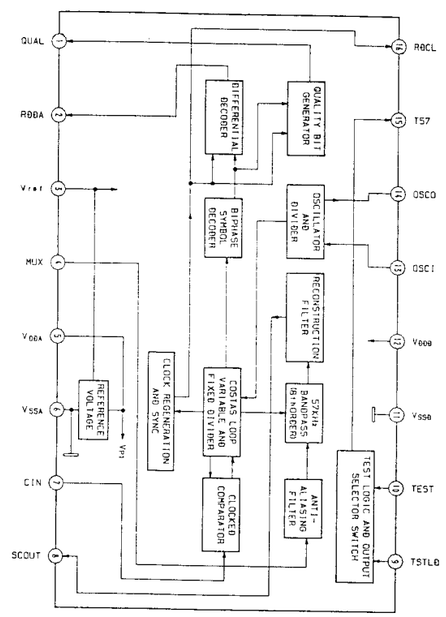

### IC301 LA3401



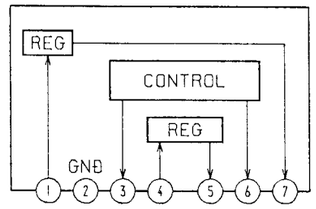

### IC401 LA1245




### IC801 SAA6579T




### IC901 LA5667



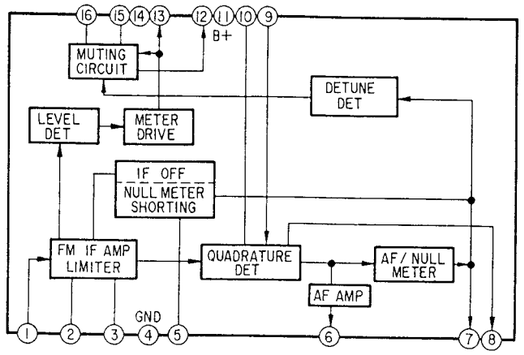

## 4-2. IC PIN
• IC701 μPD

| Pin No. | |
|---|---|
| 1 | VD |
| 2 | AN |
| 3 | AT |
| 4 | BA |
| 5 | BA |
| 6 | IF |
| 7 | NC |
| 8 | MC |
| 9 | TU |
| 10 | RE |
| 11 | 4. |
| 12 | 4. |
| 13 | GN |
| 14 | NC |
| 15 | LC |
| 16 | VD |
| 17 | PL |
| 18 | PL |
| 19 | PL |
| 20 | PL |
| 21 | BL |
| 22 | ST |
| 23 | CA |
| 24 | AS |
| 25 | AV |
| 26 | MI |
| 27 | EC |
| 28 | PC |
| 29 | RI |
| 30 | R2 |
| 31, 32 | KE |
| 33 | SI |
| 34 | AV |
| 35 | AV |
| 36 | RI |
| 37 | R1 |
| 38 | RI |
| 39 | PC |
| 40 | Vs |
| 41, 42 | IS |
| 43 to 45 | IS |
| 46 | VD |
| 47 to 78 | P1 |
| 79 | VL |
| 80 to 84 | P3 |
| 85 to 100 | 16 |

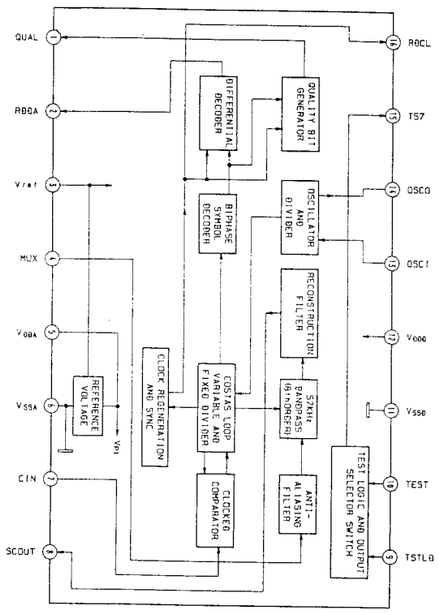
# SECTION 4
# DIAGRAMS

## 4-1. IC BLOCK DIAGRAMS

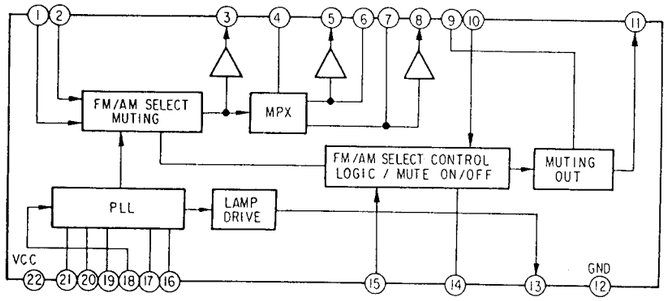
### IC221, IC251 LA1235



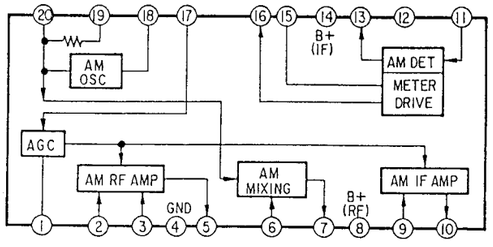

### IC801 SAA6579T



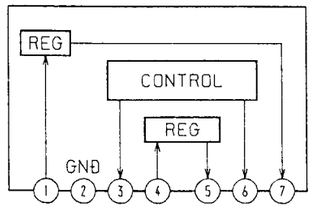

### IC301 LA3401




### IC401 LA1245




### IC901 LA5667






## 4-2. IC PIN FUNCTION

- **IC701 μPD780205GF (SYSTEM CONTROL FL DRIVE)**

| Pin No. | Pin Name | I/O | Function |
|---|---|---|---|
| 1 | VDD | – | Power supply (+5V) |
| 2 | $\overline{ANT}$ | O | ANT A/$\overline{B}$ switching output (open) |
| 3 | ATT | O | ANT ATT on/$\overline{off}$ switching output (open) |
| 4 | $\overline{BAND1}$ | O | FM/$\overline{AM}$ BAND switching output (open) |
| 5 | $\overline{BAND2}$ | O | AM BAND $\overline{MW}$/LW switching output (open) |
| 6 | IF-B | O | IF BAND $\overline{WIDE}$/NARROW switching output (open) |
| 7 | NC | – | Not used (open) |
| 8 | MONO | O | Forced FM MONO on/$\overline{off}$ output (open) |
| 9 | $\overline{TUN}$ | O | TUNING action detection output (open) |
| 10 | $\overline{RESET}$ | I | System reset input |
| 11 | 4.19 | O | Main system clock (4.19 MHz) |
| 12 | 4.19 | I | |
| 13 | GND | I | Single chip MODE select input (GND) |
| 14 | NC | – | Not used (open) |
| 15 | $\overline{LOCK}$ | I | PROGRAM SW on/off detection input |
| 16 | VDD | – | Power supply (+5V) |
| 17 | PLL $\overline{CLK}$ | O | Serial clock output for PLL LC72130 |
| 18 | PLL DATA | O | Serial data output for PLL LC72130 |
| 19 | PLL DIN | I | IF COUNT data input and PLL condition detection |
| 20 | PLL CE | O | CE signal output for PLL LC72130 |
| 21 | $\overline{BLN}$ | O | HI-BLEND on/$\overline{off}$ switching output |
| 22 | $\overline{ST}$ | I | STEREO display detection input |
| 23 | CAL | O | CAL TONE on/$\overline{off}$ switching output |
| 24 | $\overline{AST}$ | I | AUTO STOP signal detection input |
| 25 | AVss | – | GND of the A/D converter |
| 26 | $\overline{MUTE}$ | O | Muting signal on/off switching output |
| 27 | EON | O | Receive Reception, outside control output |
| 28 | $\overline{PGM}$ | I | PROGRAM SW $\overline{SET}$/OFF detection input |
| 29 | RDS DATA | I | RDS DATA input |
| 30 | R2 | I | Rotary encorder phase detection input |
| 31, 32 | KEY2, KEY1 | I | Key input |
| 33 | SI | I | SIGNAL LEVEL input |
| 34 | AVDD | – | Analog power supply of the A/D converter (+5V) |
| 35 | AVREF | I | Reference voltage of the A/D converter (+5V) |
| 36 | $\overline{RIN}$ | I | Remote controller signal input |
| 37 | R1 | I | Rotary encorder number of rotations detection input |
| 38 | $\overline{RDS\ CLK}$ | I | Clock input for RDS DATA from SAA6579T |
| 39 | $\overline{POWER}$ | I | Power on/$\overline{off}$ monitor input |
| 40 | Vss | – | System GND |
| 41, 42 | IS5, IS4 | I | Model and function setting input |
| 43 to 45 | IS3 to IS1 | I | Destination detection setting input<br>AEP, German, Italian model: S1 L, S2 L, S3 L<br>EE model: S1 H, S2 L, S3 L |
| 46 | VDD | – | Power supply (+5V) |
| 47 to 78 | P1 to P32 | O | Segment signal output to the FL tube (FL701) |
| 79 | VLOAD | – | Power supply to the FL tube (FL701) (–30V) |
| 80 to 84 | P33 to P37 | O | Segment signal output to the FL tube (FL701) |
| 85 to 100 | 16G to 1G | O | Grid signal output to the FL tube (FL701) |

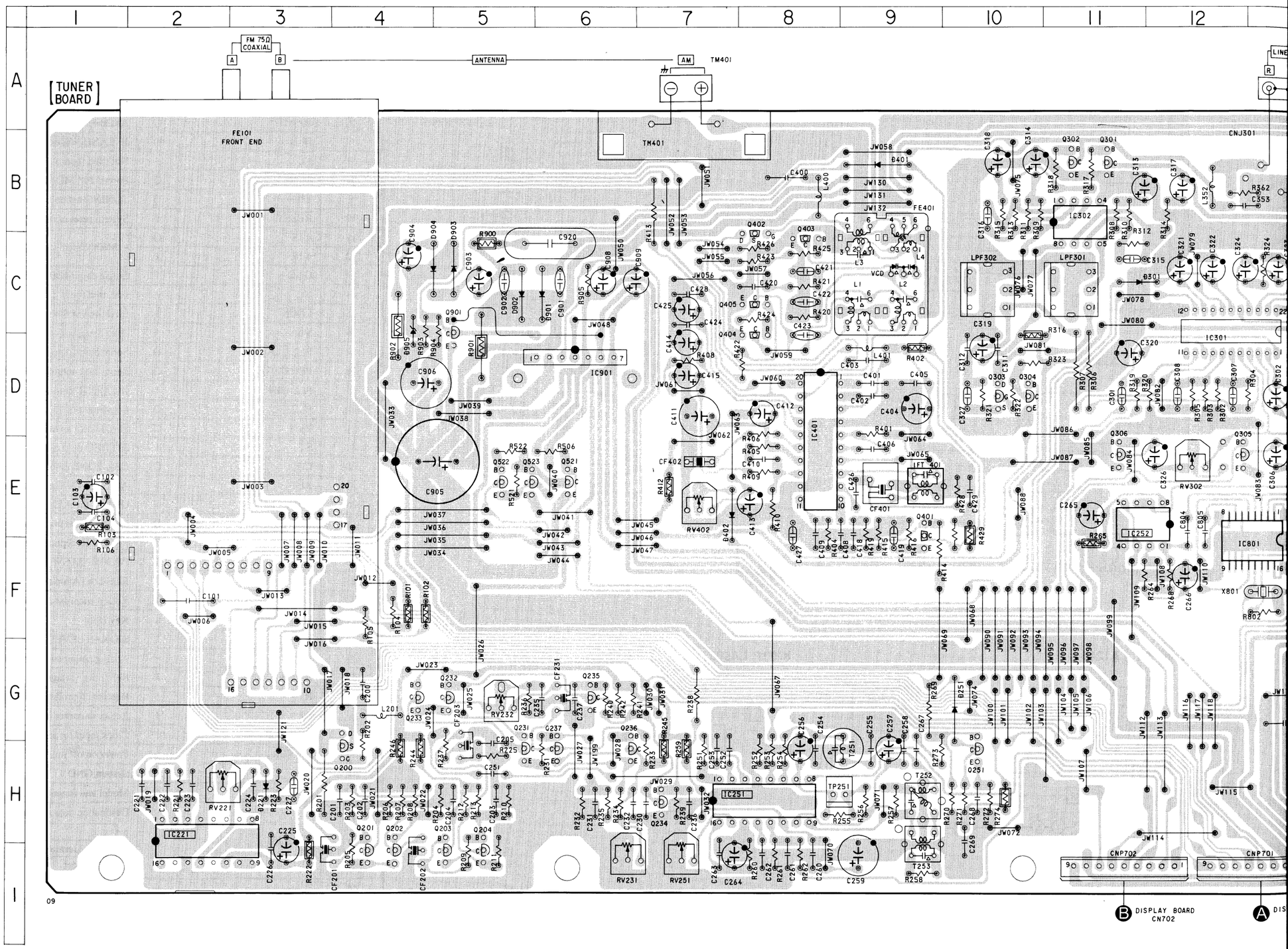
## 4-3. PRINTED WIRING BOARD — TUNER SECTION —

- **Semiconductor Location**

| Ref. No. | Location |
|---|---|
| D221 | H-3 |
| D251 | G-10 |
| D301 | C-11 |
| D401 | B-9 |
| D402 | E-7 |
| D901 | C-6 |
| D902 | C-5 |
| D903 | C-5 |
| D904 | C-4 |
| D905 | C-4 |
| D906 | I-13 |
| | |
| IC221 | H-2 |
| IC251 | H-8 |
| IC252 | E-11 |
| IC301 | C-12 |
| IC302 | B-11 |
| IC401 | E-8 |
| IC801 | E-13 |
| IC901 | D-6 |
| | |
| Q200 | G-3 |
| Q201 | I-4 |
| Q202 | I-4 |
| Q203 | I-5 |
| Q204 | I-5 |
| Q231 | G-5 |
| Q232 | G-5 |
| Q233 | G-4 |
| Q234 | H-7 |
| Q235 | G-6 |
| Q236 | G-6 |
| Q237 | G-6 |
| Q251 | H-10 |
| Q301 | B-11 |
| Q302 | B-11 |
| Q303 | D-10 |
| Q304 | D-10 |
| Q305 | E-12 |
| Q306 | E-11 |
| Q401 | E-9 |
| Q402 | B-8 |
| Q403 | C-8 |
| Q404 | C-8 |
| Q405 | C-8 |
| Q521 | E-6 |
| Q522 | E-5 |
| Q523 | E-5 |
| Q901 | C-5 |

**Note:**

- o—— : parts extracted from the component side.
- •—— : parts extracted from the conductor side.
- △ : internal component.
- ▒▒ : Pattern from the side which enable seeing.

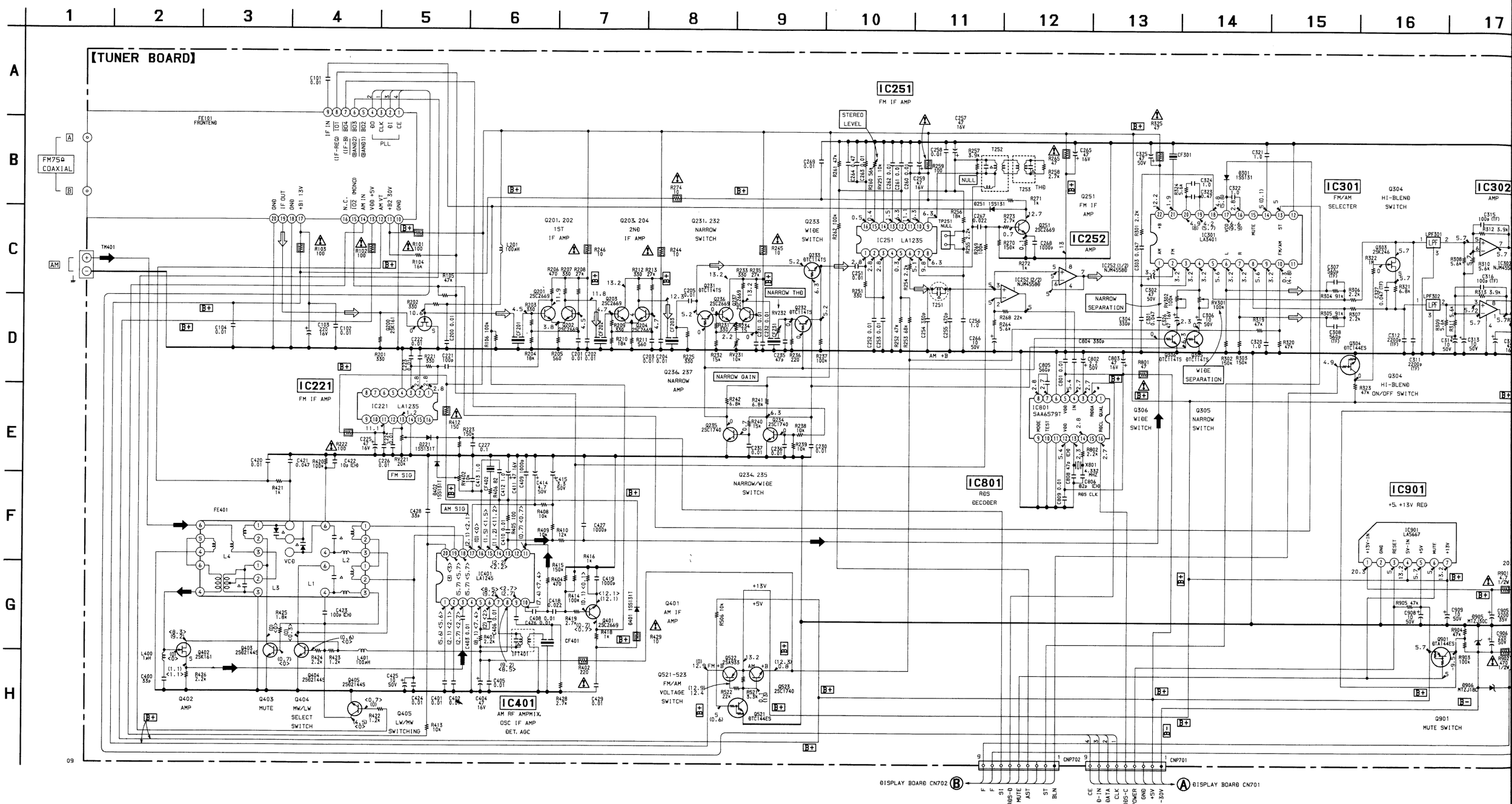


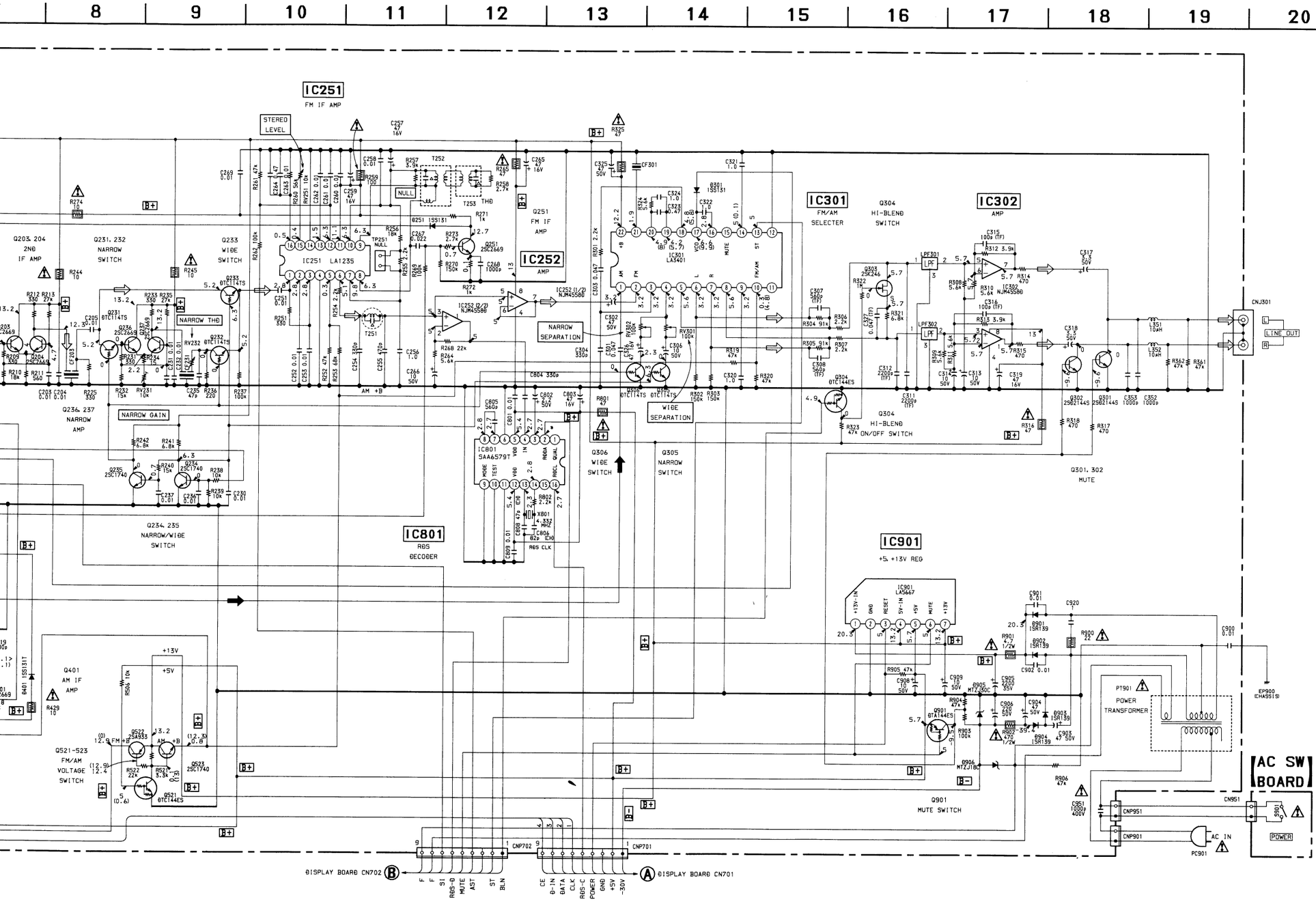
4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

ANTENNA
AM
TM401
TM401
LINE OUT
R
L
CNJ301
【AC SW BOARD】
S901
POWER
CN951
YEL
YEL
1-653-890-
BRN
BLU
AC IN
PC901
CNP951
CNP901
C951
IC901
IC401
IC302
IC301
IC251
IC252
IC801
LPF302
LPF301
CF401
CF402
RV402
RV302
RV301
RV232
RV231
RV251
X801
PT901
POWER TRANSFORMER
EP900
(CHASSIS)
CNP702
CNP701
B DISPLAY BOARD CN702
A DISPLAY BOARD CN701
1-656-888-

## 4-4. SCHEMATIC DIAGRAM — TUNER SECTION —

• See page 10 for IC Block Diagrams.





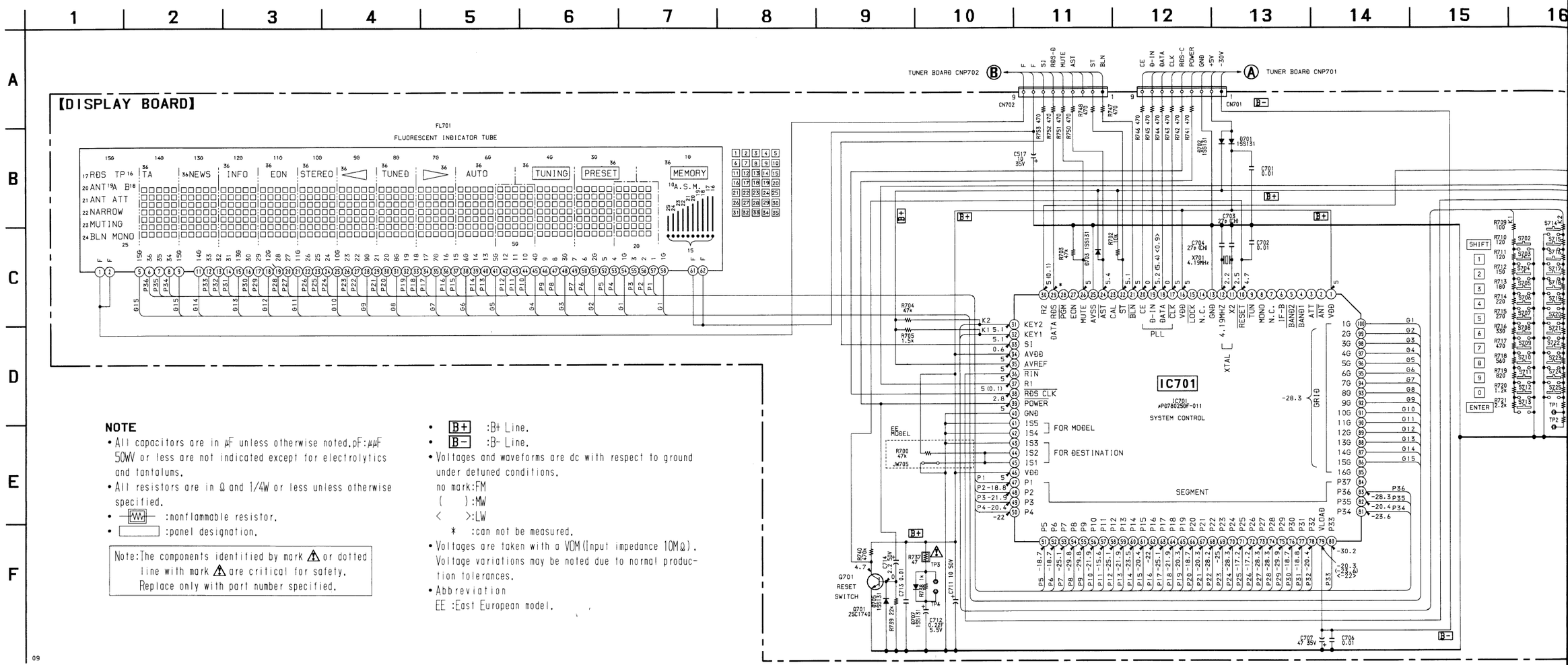

**NOTE**

- All capacitors are in μF unless otherwise noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- △ :internal component.
- :nonflammable resistor.
- :panel designation.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ :B+ Line.
- B− :B− Line.
- :adjustment for repair.
- Voltages and waveforms are dc with respect to ground under detuned conditions.
  no mark: FM
  ( ): MW
  < >: LW
  * : can not be measured.
- Voltages are taken with a VOM (Input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Signal path.
  ⇨ :FM
  ➡ :AM

## 4-5. SCHEMATIC DIAGRAM — DISPLAY SECTION — • See page 11 for IC Pin Function. (IC701)



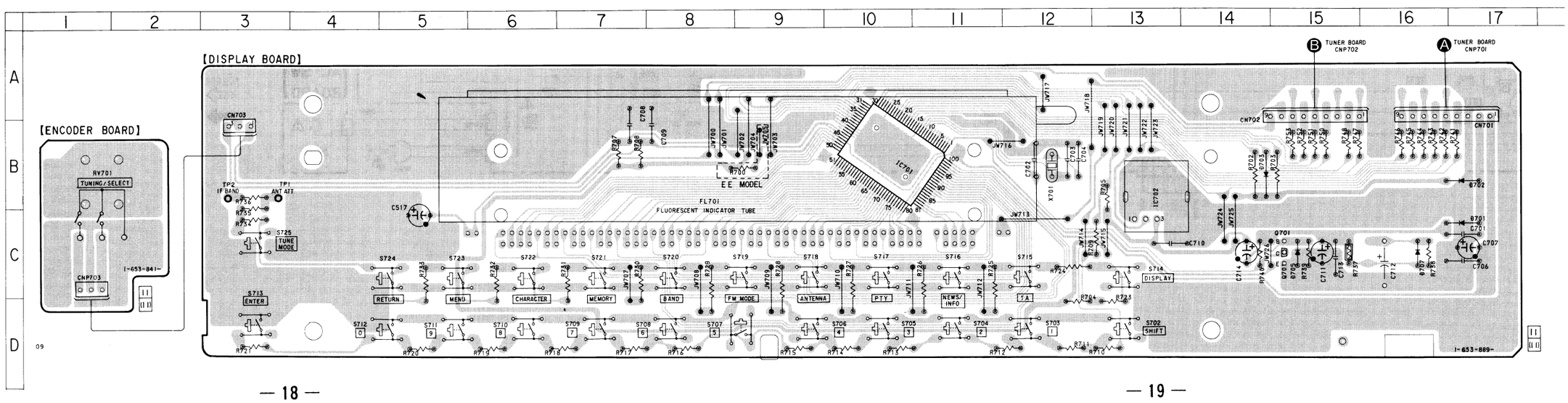

**NOTE**

- All capacitors are in μF unless noted. pF: μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4W or less unless otherwise specified.
- ▭ :nonflammable resistor.
- ▭ :panel designation.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ :B+ Line.
- B− :B− Line.
- Voltages and waveforms are dc with respect to ground under detuned conditions.
  no mark: FM
  ( ): MW
  < >: LW
  * :can not be measured.
- Voltages are taken with a VOM (Input impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Abbreviation
  EE :East European model.

## 4-6. PRINTED WIRING BOARD — DISPLAY SECTION —



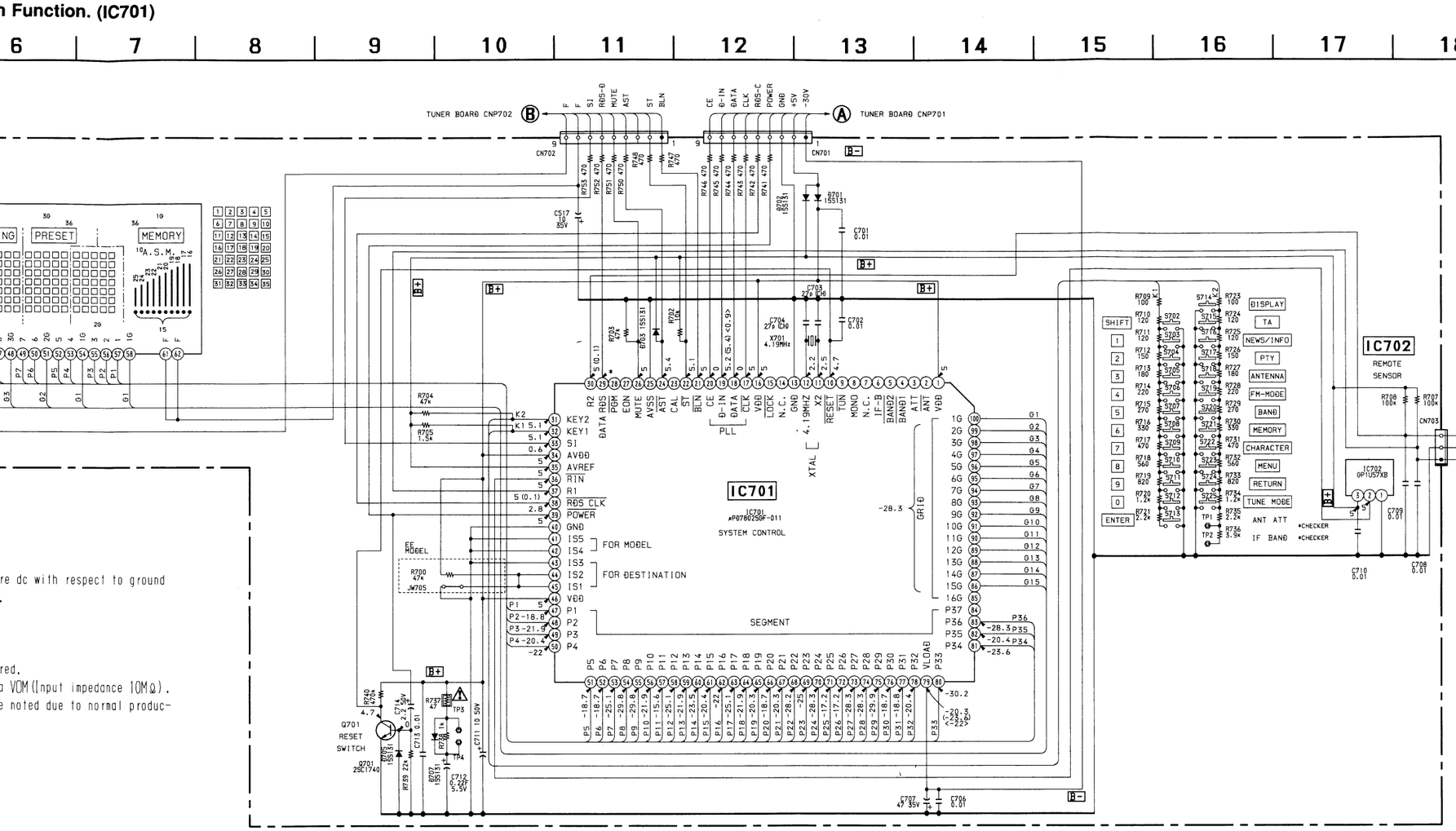


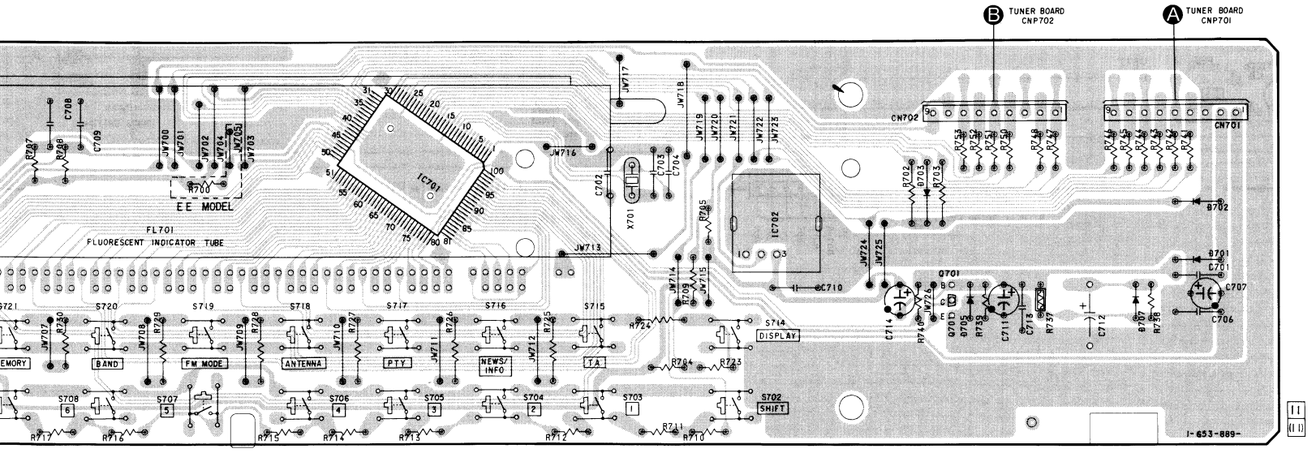



• Semi
Locat

| Ref. No |
|---|
| D701 |
| D702 |
| D703 |
| D705 |
| D707 |
| IC701 |
| IC702 |
| Q701 |

Note:
•
•
• Abbr
IT
EE




- **Semiconductor Location**

| Ref. No. | Location |
|---|---|
| D701 | C-17 |
| D702 | B-17 |
| D703 | B-14 |
| D705 | C-15 |
| D707 | C-16 |
| IC701 | B-10 |
| IC702 | B-13 |
| Q701 | C-15 |

**Note:**

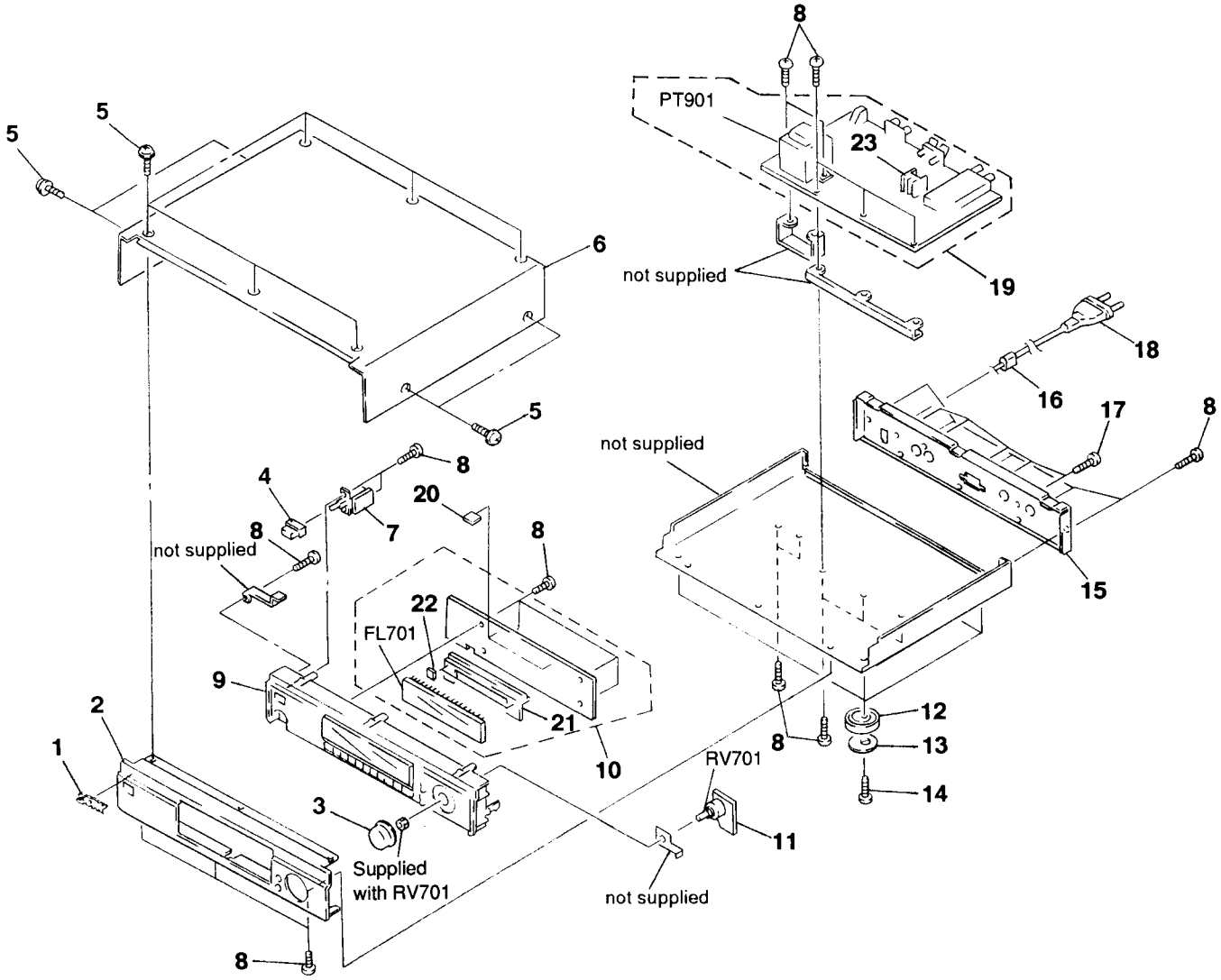
- ⟵o⟶ : parts extracted from the component side.
- ▒▒ : Pattern from the side which enable seeing.
- Abbreviation
  IT : Italian model.
  EE : East European model.

# SECTION 5
# EXPLODED VIEW

NOTE:

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
  G : German model
  IT : Italian model
  EE : East European model

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.




| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| 1 | 4-942-568-01 | EMBLEM (NO. 5), SONY | |
| 2 | 4-970-683-51 | PANEL, FRONT | |
| 3 | 4-970-684-01 | KNOB (T) | |
| 4 | 4-917-460-01 | KNOB, POWER | |
| 5 | 3-704-366-01 | SCREW (CASE) (M3X8) | |
| 6 | 4-974-321-11 | CASE | |
| * 7 | 1-656-890-11 | AC SW BOARD | |
| 8 | 4-967-961-01 | SCREW (3X8) (SPECIAL) | |
| 9 | X-4946-076-1 | BASE ASSY (B/3), PANEL | |
| * 10 | A-4377-994-A | DISPLAY BOARD, COMPLETE (AEP, IT, G) | |
| * 10 | A-4377-995-A | DISPLAY BOARD, COMPLETE (EE) | |
| * 11 | 1-656-891-11 | ENCODER BOARD | |
| 12 | 4-970-123-01 | FOOT (F50180S) | |
| 13 | 4-970-124-01 | CUSHION (F50180S) | |
| 14 | 7-685-650-79 | SCREW +BVTP 3X16 TYPE2 IT-3 | |

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| * 15 | 4-974-313-11 | PANEL, BACK (AEP, IT, G) | |
| * 15 | 4-974-313-21 | PANEL, BACK (EE) | |
| 16 | 3-703-244-00 | BUSHING, CORD | |
| 17 | 3-704-515-41 | SCREW (BV/RING) | |
| ⚠18 | 1-575-651-21 | CORD, POWER | |
| * 19 | A-4377-992-A | TUNER BOARD, COMPLETE (AEP, IT, G) | |
| * 19 | A-4377-993-A | TUNER BOARD, COMPLETE (EE) | |
| 20 | 9-911-842-XX | CUSHION (S) | |
| * 21 | 4-945-292-01 | HOLDER, INDICATION TUBE | |
| * 22 | 4-921-941-71 | CUSHION (FL) | |
| * 23 | 4-911-383-01 | HEAT SINK | |
| FL701 | 1-517-177-21 | INDICATOR TUBE, FLUORESCENT | |
| ⚠PT901 | 1-423-525-11 | TRANSFORMER, POWER | |
| RV701 | 1-466-336-22 | ENCODER, ROTARY (TUNING/SELECT) | |

**AC SW** **DISPLAY**

# SECTION 6
# ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: μ , for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH
- Abbreviation
  G : German model
  IT : Italian model
  EE : East European model

| Ref. No. | Part No. | Description | | | | Remark |
|---|---|---|---|---|---|---|
| * | 1-656-890-11 | AC SW BOARD | | | | |
| | | ********** | | | | |
| | | < SWITCH > | | | | |
| ⚠S901 | 1-572-267-51 | SWITCH, PUSH (AC POWER) (1 KEY) (POWER) | | | | |
| ********** | | | | | | |
| * | A-4377-994-A | DISPLAY BOARD, COMPLETE (AEP, IT, G) | | | | |
| | | ********** | | | | |
| * | A-4377-995-A | DISPLAY BOARD, COMPLETE (EE) | | | | |
| | | ********** | | | | |
| * | 4-921-941-71 | CUSHION (FL) | | | | |
| * | 4-945-292-01 | HOLDER, INDICATION TUBE | | | | |
| | | < CAPACITOR > | | | | |
| C517 | 1-126-051-11 | ELECT | 47uF | 20% | 35V | |
| C701 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C702 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C703 | 1-162-209-31 | CERAMIC | 27PF | 5% | 50V | |
| C704 | 1-162-209-31 | CERAMIC | 27PF | 5% | 50V | |
| C706 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C707 | 1-126-051-11 | ELECT | 47uF | 20% | 35V | |
| C708 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C709 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C710 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C711 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C712 | 1-104-905-11 | CAP, DOUBLE LAYERS 0.22F | | | | |
| C713 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C714 | 1-126-045-11 | ELECT | 2.2uF | 20% | 50V | |
| | | < DIODE > | | | | |
| D701 | 8-719-815-85 | DIODE 1S1585 | | | | |
| D702 | 8-719-815-85 | DIODE 1S1585 | | | | |
| D703 | 8-719-815-85 | DIODE 1S1585 | | | | |
| D705 | 8-719-815-85 | DIODE 1S1585 | | | | |
| D707 | 8-719-815-85 | DIODE 1S1585 | | | | |
| | | < FLUORESCENT INDICATOR > | | | | |
| FL701 | 1-517-177-21 | INDICATOR TUBE, FLUORESCENT | | | | |

| Ref. No. | Part No. | Description | | | | Remark |
|---|---|---|---|---|---|---|
| | | < IC > | | | | |
| IC701 | 8-759-338-20 | IC uPD780205GF-011-3B9 | | | | |
| IC702 | 8-749-923-43 | IC GP1U57XB | | | | |
| | | < TRANSISTOR > | | | | |
| Q701 | 8-729-119-78 | TRANSISTOR 2SC2785-HFE | | | | |
| | | < RESISTOR > | | | | |
| R700 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | (EE) |
| R702 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R703 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R704 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R705 | 1-249-419-11 | CARBON | 1.5K | 5% | 1/4W | F |
| R707 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R708 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R709 | 1-247-807-31 | CARBON | 100 | 5% | 1/4W | |
| R710 | 1-249-406-11 | CARBON | 120 | 5% | 1/4W | F |
| R711 | 1-249-406-11 | CARBON | 120 | 5% | 1/4W | F |
| R712 | 1-249-407-11 | CARBON | 150 | 5% | 1/4W | F |
| R713 | 1-249-408-11 | CARBON | 180 | 5% | 1/4W | F |
| R714 | 1-247-815-91 | CARBON | 220 | 5% | 1/4W | |
| R715 | 1-249-410-11 | CARBON | 270 | 5% | 1/4W | F |
| R716 | 1-249-411-11 | CARBON | 330 | 5% | 1/4W | |
| R717 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R718 | 1-249-414-11 | CARBON | 560 | 5% | 1/4W | F |
| R719 | 1-249-416-11 | CARBON | 820 | 5% | 1/4W | F |
| R720 | 1-249-418-11 | CARBON | 1.2K | 5% | 1/4W | F |
| R721 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R723 | 1-247-807-31 | CARBON | 100 | 5% | 1/4W | |
| R724 | 1-249-406-11 | CARBON | 120 | 5% | 1/4W | F |
| R725 | 1-249-406-11 | CARBON | 120 | 5% | 1/4W | F |
| R726 | 1-249-407-11 | CARBON | 150 | 5% | 1/4W | F |
| R727 | 1-249-408-11 | CARBON | 180 | 5% | 1/4W | F |
| R728 | 1-247-815-91 | CARBON | 220 | 5% | 1/4W | |
| R729 | 1-249-410-11 | CARBON | 270 | 5% | 1/4W | F |
| R730 | 1-249-411-11 | CARBON | 330 | 5% | 1/4W | |
| R731 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R732 | 1-249-414-11 | CARBON | 560 | 5% | 1/4W | F |
| R733 | 1-249-416-11 | CARBON | 820 | 5% | 1/4W | F |
| R734 | 1-249-418-11 | CARBON | 1.2K | 5% | 1/4W | F |
| R735 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R736 | 1-249-424-11 | CARBON | 3.9K | 5% | 1/4W | F |

| Ref.No. | Part No. | Description | | | | Remark |
|---|---|---|---|---|---|---|
| ⚠R737 | 1-249-401-11 | CARBON | 47 | 5% | 1/4W | F |
| R738 | 1-249-417-11 | CARBON | 1K | 5% | 1/4W | F |
| R739 | 1-249-433-11 | CARBON | 22K | 5% | 1/4W | |
| R740 | 1-247-895-00 | CARBON | 470K | 5% | 1/4W | |
| R741 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R742 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R743 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R744 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R745 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R746 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R747 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R748 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R750 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R751 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R752 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R753 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| | | < SWITCH > | | | | |
| S702 | 1-554-303-21 | SWITCH, TACTILE (SHIFT) | | | | |
| S703 | 1-554-303-21 | SWITCH, TACTILE (1) | | | | |
| S704 | 1-554-303-21 | SWITCH, TACTILE (2) | | | | |
| S705 | 1-554-303-21 | SWITCH, TACTILE (3) | | | | |
| S706 | 1-554-303-21 | SWITCH, TACTILE (4) | | | | |
| S707 | 1-554-303-21 | SWITCH, TACTILE (5) | | | | |
| S708 | 1-554-303-21 | SWITCH, TACTILE (6) | | | | |
| S709 | 1-554-303-21 | SWITCH, TACTILE (7) | | | | |
| S710 | 1-554-303-21 | SWITCH, TACTILE (8) | | | | |
| S711 | 1-554-303-21 | SWITCH, TACTILE (9) | | | | |
| S712 | 1-554-303-21 | SWITCH, TACTILE (0) | | | | |
| S713 | 1-554-303-21 | SWITCH, TACTILE (ENTER) | | | | |
| S714 | 1-554-303-21 | SWITCH, TACTILE (DISPLAY) | | | | |
| S715 | 1-554-303-21 | SWITCH, TACTILE (TA) | | | | |
| S716 | 1-554-303-21 | SWITCH, TACTILE (NEWS/INFO) | | | | |
| S717 | 1-554-303-21 | SWITCH, TACTILE (PTY) | | | | |
| S718 | 1-554-303-21 | SWITCH, TACTILE (ANTENNA) | | | | |
| S719 | 1-554-303-21 | SWITCH, TACTILE (FM MODE) | | | | |
| S720 | 1-554-303-21 | SWITCH, TACTILE (BAND) | | | | |
| S721 | 1-554-303-21 | SWITCH, TACTILE (MEMORY) | | | | |
| S722 | 1-554-303-21 | SWITCH, TACTILE (CHARACTER) | | | | |
| S723 | 1-554-303-21 | SWITCH, TACTILE (MENU) | | | | |
| S724 | 1-554-303-21 | SWITCH, TACTILE (RETURN) | | | | |
| S725 | 1-554-303-21 | SWITCH, TACTILE (TUNE MODE) | | | | |
| | | < VIBRATOR > | | | | |
| X701 | 1-760-422-11 | VIBRATOR, CRYSTAL (4.19MHz) | | | | |
| ********** | | | | | | |
| * | 1-656-891-11 | ENCODER BOARD | | | | |
| | | ********** | | | | |
| | | < VARIABLE RESISTOR > | | | | |
| RV701 | 1-466-336-22 | ENCODER, ROTARY (TUNING/SELECT) | | | | |
| ********** | | | | | | |
| * | A-4377-992-A | TUNER BOARD, COMPLETE (AEP, IT, G) | | | | |
| | | ********** | | | | |
| * | A-4377-993-A | TUNER BOARD, COMPLETE (EE) | | | | |
| | | ********** | | | | |
| * | 4-911-383-01 | HEAT SINK | | | | |
| | | < CAPACITOR > | | | | |
| C101 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C102 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C103 | 1-126-024-11 | ELECT | 220uF | 20% | 16V | |
| C104 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C200 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C201 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C202 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C203 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C204 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C205 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C221 | 1-162-282-31 | CERAMIC | 100PF | 10% | 50V | |
| C222 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C223 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C224 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C225 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C226 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C227 | 1-136-165-00 | FILM | 0.1uF | 5% | 50V | |
| C230 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C231 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C232 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C235 | 1-162-215-31 | CERAMIC | 47PF | 5% | 50V | |
| C236 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C237 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C251 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C252 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C253 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C254 | 1-162-288-31 | CERAMIC | 330PF | 10% | 50V | |
| C255 | 1-162-290-31 | CERAMIC | 470PF | 10% | 50V | |
| C256 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C257 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C258 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C259 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C260 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C261 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C262 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

# TUNER

| Ref. No. | Part No. | Description | | | | Remark |
|---|---|---|---|---|---|---|
| C263 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C264 | 1-126-043-11 | ELECT | 0.47uF | 20% | 50V | |
| C265 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C266 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C267 | 1-161-494-00 | CERAMIC | 0.022uF | | 25V | |
| C268 | 1-162-294-31 | CERAMIC | 0.001uF | 10% | 50V | |
| C269 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C301 | 1-136-161-00 | FILM | 0.047uF | 5% | 50V | |
| C302 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C303 | 1-136-161-00 | FILM | 0.047uF | 5% | 50V | |
| C304 | 1-162-288-31 | CERAMIC | 330PF | 10% | 50V | |
| C306 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C307 | 1-130-468-00 | MYLAR | 560PF | 5% | 50V | |
| C308 | 1-130-468-00 | MYLAR | 560PF | 5% | 50V | |
| C311 | 1-162-302-11 | CERAMIC | 0.0022uF | 30% | 16V | |
| C312 | 1-162-302-11 | CERAMIC | 0.0022uF | 30% | 16V | |
| C313 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C314 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C315 | 1-110-335-11 | MYLAR | 100PF | 5% | 50V | |
| C316 | 1-110-335-11 | MYLAR | 100PF | 5% | 50V | |
| C317 | 1-126-303-11 | ELECT | 3.3uF | 20% | 50V | |
| C318 | 1-126-303-11 | ELECT | 3.3uF | 20% | 50V | |
| C319 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C320 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C321 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C322 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C323 | 1-126-043-11 | ELECT | 0.47uF | 20% | 50V | |
| C324 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C325 | 1-126-051-11 | ELECT | 47uF | 20% | 50V | |
| C326 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C327 | 1-136-161-00 | FILM | 0.047uF | 5% | 50V | |
| C352 | 1-162-294-31 | CERAMIC | 0.001uF | 10% | 50V | |
| C353 | 1-162-294-31 | CERAMIC | 0.001uF | 10% | 50V | |
| C400 | 1-162-211-31 | CERAMIC | 33PF | 5% | 50V | |
| C401 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C402 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C403 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C404 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C405 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C406 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C408 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C409 | 1-162-294-31 | CERAMIC | 0.001uF | 10% | 50V | |
| C410 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C411 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C412 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C413 | 1-126-044-11 | ELECT | 1uF | 20% | 50V | |
| C414 | 1-126-163-11 | ELECT | 4.7uF | 20% | 50V | |
| C415 | 1-126-303-11 | ELECT | 3.3uF | 20% | 50V | |
| C418 | 1-161-494-00 | CERAMIC | 0.022uF | | 25V | |
| C419 | 1-102-074-00 | CERAMIC | 0.001uF | 10% | 50V | |
| C420 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C421 | 1-136-161-00 | FILM | 0.047uF | 5% | 50V | |
| C422 | 1-164-019-11 | CERAMIC | 10PF | 0.5PF | 50V | |
| C423 | 1-102-973-00 | CERAMIC | 100PF | 5% | 50V | |
| C424 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C425 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C426 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C427 | 1-102-074-00 | CERAMIC | 0.001uF | 10% | 50V | |
| C428 | 1-162-211-31 | CERAMIC | 33PF | 5% | 50V | |
| C429 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C801 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C802 | 1-126-045-11 | ELECT | 2.2uF | 20% | 50V | |
| C803 | 1-126-022-11 | ELECT | 47uF | 20% | 16V | |
| C804 | 1-162-288-31 | CERAMIC | 330PF | 10% | 50V | |
| C805 | 1-162-291-31 | CERAMIC | 560PF | 10% | 50V | |
| C806 | 1-102-527-11 | CERAMIC | 82PF | 5% | 50V | |
| C808 | 1-101-880-00 | CERAMIC | 47PF | 5% | 50V | |
| C809 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C900 | 1-162-306-11 | CERAMIC | 0.01uF | 30% | 16V | |
| C901 | 1-101-004-00 | CERAMIC | 0.01uF | | 50V | |
| C902 | 1-101-004-00 | CERAMIC | 0.01uF | | 50V | |
| C903 | 1-126-051-11 | ELECT | 47uF | 20% | 50V | |
| C904 | 1-126-051-11 | ELECT | 47uF | 20% | 50V | |
| C905 | 1-124-602-00 | ELECT | 2200uF | 20% | 35V | |
| C906 | 1-126-053-11 | ELECT | 220uF | 20% | 50V | |
| C908 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C909 | 1-126-059-11 | ELECT | 10uF | 20% | 50V | |
| C920 | 1-130-789-00 | FILM | 1uF | 5% | 100V | |
| ⚠C951 | 1-161-741-00 | CERAMIC | 0.001uF | 10% | 400V | |

< FILTER >

| | | |
|---|---|---|
| CF201 | 1-567-389-11 | FILTER, CERAMIC |
| CF202 | 1-567-389-11 | FILTER, CERAMIC |
| CF203 | 1-567-389-11 | FILTER, CERAMIC |
| CF231 | 1-567-107-71 | FILTER, CERAMIC |
| CF301 | 1-567-250-11 | OSCILLATOR, CERAMIC |
| CF401 | 1-527-826-00 | FILTER, CERAMIC |
| CF402 | 1-527-981-00 | FILTER, CERAMIC |

< CONNECTOR >

| | | |
|---|---|---|
| CNJ301 | 1-568-250-21 | JACK, PIN 2P (LINE OUT) |

< CONNECTOR >

| | | |
|---|---|---|
| CNP701 | 1-766-282-11 | PIN, CONNECTOR (PC BOARD) 9P |
| CNP702 | 1-766-282-11 | PIN, CONNECTOR (PC BOARD) 9P |
| CNP901 | 1-580-230-11 | PIN, CONNECTOR (PC BOARD) 2P |
| CNP951 | 1-564-321-00 | PIN, CONNECTOR 2P |

< DIODE >

| | | |
|---|---|---|
| D221 | 8-719-815-85 | DIODE 1S1585 |

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| D251 | 8-719-815-85 | DIODE 1S1585 | |
| D301 | 8-719-815-85 | DIODE 1S1585 | |
| D401 | 8-719-815-85 | DIODE 1S1585 | |
| D402 | 8-719-815-85 | DIODE 1S1585 | |
| D901 | 8-719-970-02 | DIODE 1SR139-400 | |
| D902 | 8-719-970-02 | DIODE 1SR139-400 | |
| D903 | 8-719-970-02 | DIODE 1SR139-400 | |
| D904 | 8-719-970-02 | DIODE 1SR139-400 | |
| D905 | 8-719-982-21 | DIODE MTZJ-30C | |
| D906 | 8-719-922-03 | DIODE MTZJ-18C | |
| | | < GROUND PLATE > | |
| EP900 | 4-957-933-01 | PLATE, GROUND | |
| | | < FRONTEND > | |
| FE101 | 1-233-384-11 | ENCAPSULATED COMPONENT (ANTENNA) (EE) | |
| FE101 | 1-693-289-11 | FRONT END (ANTENNA) (AEP, IT, G) | |
| FE401 | 1-233-312-11 | ENCAPSULATED COMPONENT | |
| | | < IC > | |
| IC221 | 8-759-812-35 | IC LA1235 | |
| IC251 | 8-759-812-35 | IC LA1235 | |
| IC252 | 8-759-634-51 | IC M5218AP | |
| IC301 | 8-759-801-80 | IC LA3401 | |
| IC302 | 8-759-634-51 | IC M5218AP | |
| IC401 | 8-759-812-45 | IC LA1245 | |
| IC801 | 8-759-065-98 | IC SAA6579T | |
| IC901 | 8-759-820-09 | IC LA5667 | |
| | | < IFT > | |
| IFT401 | 1-404-326-00 | TRANSFORMER, IF | |
| | | < COIL > | |
| L201 | 1-410-521-11 | INDUCTOR 100uH | |
| L351 | 1-410-509-11 | INDUCTOR 10uH | |
| L352 | 1-410-509-11 | INDUCTOR 10uH | |
| L400 | 1-414-142-11 | INDUCTOR 1uH | |
| L401 | 1-410-521-11 | INDUCTOR 100uH | |
| | | < FILTER > | |
| LPF301 | 1-235-164-00 | FILTER, LOW PASS | |
| LPF302 | 1-235-164-00 | FILTER, LOW PASS | |
| | | < TRANSFORMER > | |
| ⚠PT901 | 1-423-525-11 | TRANSFORMER, POWER | |
| | | < TRANSISTOR > | |
| Q200 | 8-729-231-20 | TRANSISTOR 2SK161-YGR | |
| Q201 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q202 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q203 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q204 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q231 | 8-729-904-39 | TRANSISTOR DTC114TS | |
| Q232 | 8-729-904-39 | TRANSISTOR DTC114TS | |
| Q233 | 8-729-904-39 | TRANSISTOR DTC114TS | |
| Q234 | 8-729-119-78 | TRANSISTOR 2SC2785-HFE | |
| Q235 | 8-729-119-78 | TRANSISTOR 2SC2785-HFE | |
| Q236 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q237 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q251 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q301 | 8-729-922-37 | TRANSISTOR 2SD2144S-UVW | |
| Q302 | 8-729-922-37 | TRANSISTOR 2SD2144S-UVW | |
| Q303 | 8-729-202-67 | TRANSISTOR 2SK246-GR3 | |
| Q304 | 8-729-900-89 | TRANSISTOR DTC144ES | |
| Q305 | 8-729-904-39 | TRANSISTOR DTC114TS | |
| Q306 | 8-729-904-39 | TRANSISTOR DTC114TS | |
| Q401 | 8-729-230-99 | TRANSISTOR 2SC2669OY-TPE4 | |
| Q402 | 8-729-231-20 | TRANSISTOR 2SK161-YGR | |
| Q403 | 8-729-922-37 | TRANSISTOR 2SD2144S-UVW | |
| Q404 | 8-729-922-37 | TRANSISTOR 2SD2144S-UVW | |
| Q405 | 8-729-922-37 | TRANSISTOR 2SD2144S-UVW | |
| Q521 | 8-729-900-89 | TRANSISTOR DTC144ES | |
| Q522 | 8-729-119-76 | TRANSISTOR 2SA1175-HFE | |
| Q523 | 8-729-119-78 | TRANSISTOR 2SC2785-HFE | |
| Q901 | 8-729-900-65 | TRANSISTOR DTA144ES | |
| | | < RESISTOR > | |
| ⚠R101 | 1-249-405-11 | CARBON 100 5% 1/4W F | |
| ⚠R102 | 1-249-405-11 | CARBON 100 5% 1/4W F | |
| ⚠R103 | 1-249-405-11 | CARBON 100 5% 1/4W F | |
| R104 | 1-249-429-11 | CARBON 10K 5% 1/4W | |
| R105 | 1-249-437-11 | CARBON 47K 5% 1/4W | |
| R106 | 1-249-441-11 | CARBON 100K 5% 1/4W | |
| R201 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| R202 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| R203 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| R204 | 1-249-432-11 | CARBON 18K 5% 1/4W | |
| R205 | 1-249-414-11 | CARBON 560 5% 1/4W F | |
| R206 | 1-249-413-11 | CARBON 470 5% 1/4W F | |
| R207 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| R208 | 1-249-434-11 | CARBON 27K 5% 1/4W | |
| R209 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| R210 | 1-249-432-11 | CARBON 18K 5% 1/4W | |
| R211 | 1-249-414-11 | CARBON 560 5% 1/4W F | |
| R212 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| R213 | 1-249-434-11 | CARBON 27K 5% 1/4W | |
| R221 | 1-249-411-11 | CARBON 330 5% 1/4W | |
| ⚠R222 | 1-249-405-11 | CARBON 100 5% 1/4W F | |
| R223 | 1-247-883-00 | CARBON 150K 5% 1/4W | |

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

# TUNER

| Ref. No. | Part No. | Description | | | | Remark |
|---|---|---|---|---|---|---|
| R225 | 1-249-411-11 | CARBON | 330 | 5% | 1/4W | |
| R231 | 1-249-411-11 | CARBON | 330 | 5% | 1/4W | |
| R232 | 1-249-431-11 | CARBON | 15K | 5% | 1/4W | |
| R233 | 1-249-411-11 | CARBON | 330 | 5% | 1/4W | |
| R234 | 1-249-395-11 | CARBON | 15 | 5% | 1/4W | F |
| R235 | 1-249-434-11 | CARBON | 27K | 5% | 1/4W | |
| R236 | 1-247-815-91 | CARBON | 220 | 5% | 1/4W | |
| R237 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R238 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R239 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R240 | 1-249-431-11 | CARBON | 15K | 5% | 1/4W | |
| R241 | 1-249-427-11 | CARBON | 6.8K | 5% | 1/4W | F |
| R242 | 1-249-427-11 | CARBON | 6.8K | 5% | 1/4W | F |
| ⚠R244 | 1-249-393-11 | CARBON | 10 | 5% | 1/4W | F |
| ⚠R245 | 1-249-393-11 | CARBON | 10 | 5% | 1/4W | F |
| ⚠R246 | 1-249-393-11 | CARBON | 10 | 5% | 1/4W | F |
| R251 | 1-249-411-11 | CARBON | 330 | 5% | 1/4W | |
| R252 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R253 | 1-249-439-11 | CARBON | 68K | 5% | 1/4W | |
| R254 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R255 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R256 | 1-249-432-11 | CARBON | 18K | 5% | 1/4W | |
| R257 | 1-249-424-11 | CARBON | 3.9K | 5% | 1/4W | F |
| R258 | 1-249-422-11 | CARBON | 2.7K | 5% | 1/4W | F |
| ⚠R259 | 1-249-405-11 | CARBON | 100 | 5% | 1/4W | F |
| R260 | 1-249-438-11 | CARBON | 56K | 5% | 1/4W | |
| R261 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R262 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R264 | 1-249-426-11 | CARBON | 5.6K | 5% | 1/4W | |
| ⚠R265 | 1-249-401-11 | CARBON | 47 | 5% | 1/4W | F |
| R268 | 1-249-433-11 | CARBON | 22K | 5% | 1/4W | |
| R269 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R270 | 1-247-883-00 | CARBON | 150K | 5% | 1/4W | |
| R271 | 1-249-417-11 | CARBON | 1K | 5% | 1/4W | F |
| R272 | 1-249-417-11 | CARBON | 1K | 5% | 1/4W | F |
| R273 | 1-249-422-11 | CARBON | 2.7K | 5% | 1/4W | F |
| ⚠R274 | 1-249-393-11 | CARBON | 10 | 5% | 1/4W | F |
| R301 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R302 | 1-247-883-00 | CARBON | 150K | 5% | 1/4W | |
| R303 | 1-247-883-00 | CARBON | 150K | 5% | 1/4W | |
| R304 | 1-247-878-00 | CARBON | 91K | 5% | 1/4W | |
| R305 | 1-247-878-00 | CARBON | 91K | 5% | 1/4W | |
| R306 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R307 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R308 | 1-249-426-11 | CARBON | 5.6K | 5% | 1/4W | |
| R309 | 1-249-426-11 | CARBON | 5.6K | 5% | 1/4W | |
| R310 | 1-249-426-11 | CARBON | 5.6K | 5% | 1/4W | |
| R311 | 1-249-426-11 | CARBON | 5.6K | 5% | 1/4W | |
| R312 | 1-249-424-11 | CARBON | 3.9K | 5% | 1/4W | F |
| R313 | 1-249-424-11 | CARBON | 3.9K | 5% | 1/4W | F |

| Ref. No. | Part No. | Description | | | | Remark |
|---|---|---|---|---|---|---|
| R314 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R315 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| ⚠R316 | 1-249-401-11 | CARBON | 47 | 5% | 1/4W | F |
| R317 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | |
| R318 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | |
| R319 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R320 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R321 | 1-249-427-11 | CARBON | 6.8K | 5% | 1/4W | F |
| R322 | 1-247-903-00 | CARBON | 1M | 5% | 1/4W | |
| R323 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R324 | 1-249-426-11 | CARBON | 5.6K | 5% | 1/4W | |
| ⚠R325 | 1-249-401-11 | CARBON | 47 | 5% | 1/4W | F |
| R361 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R362 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R401 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| ⚠R402 | 1-249-409-11 | CARBON | 220 | 5% | 1/4W | F |
| R404 | 1-249-413-11 | CARBON | 470 | 5% | 1/4W | F |
| R405 | 1-247-807-31 | CARBON | 100 | 5% | 1/4W | |
| R406 | 1-249-404-00 | CARBON | 82 | 5% | 1/4W | F |
| R408 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R409 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R410 | 1-249-430-11 | CARBON | 12K | 5% | 1/4W | |
| ⚠R412 | 1-249-407-11 | CARBON | 150 | 5% | 1/4W | F |
| R413 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R414 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R415 | 1-247-883-00 | CARBON | 150K | 5% | 1/4W | |
| R416 | 1-249-417-11 | CARBON | 1K | 5% | 1/4W | F |
| R418 | 1-249-417-11 | CARBON | 1K | 5% | 1/4W | F |
| R419 | 1-249-422-11 | CARBON | 2.7K | 5% | 1/4W | F |
| R420 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R421 | 1-249-417-11 | CARBON | 1K | 5% | 1/4W | F |
| R422 | 1-249-418-11 | CARBON | 1.2K | 5% | 1/4W | F |
| R423 | 1-249-418-11 | CARBON | 1.2K | 5% | 1/4W | F |
| R424 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| R425 | 1-249-420-11 | CARBON | 1.8K | 5% | 1/4W | F |
| R426 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| ⚠R428 | 1-249-422-11 | CARBON | 2.7K | 5% | 1/4W | F |
| ⚠R429 | 1-249-421-11 | CARBON | 10 | 5% | 1/4W | F |
| R506 | 1-249-429-11 | CARBON | 10K | 5% | 1/4W | |
| R521 | 1-249-423-11 | CARBON | 3.3K | 5% | 1/4W | F |
| R522 | 1-249-433-11 | CARBON | 22K | 5% | 1/4W | |
| ⚠R801 | 1-249-401-11 | CARBON | 47 | 5% | 1/4W | F |
| R802 | 1-249-421-11 | CARBON | 2.2K | 5% | 1/4W | F |
| ⚠R900 | 1-249-397-11 | CARBON | 22 | 5% | 1/4W | F |
| ⚠R901 | 1-249-482-11 | CARBON | 4.7 | 5% | 1/2W | F |
| ⚠R902 | 1-247-747-11 | CARBON | 470 | 5% | 1/2W | F |
| R903 | 1-249-441-11 | CARBON | 100K | 5% | 1/4W | |
| R904 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R905 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |
| R906 | 1-249-437-11 | CARBON | 47K | 5% | 1/4W | |

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

| Ref. No. | Part No. | Description | Remark |
|---|---|---|---|
| | | < VARIABLE RESISTOR > | |
| RV221 | 1-237-460-11 | RES, ADJ, CARBON 20K | |
| RV231 | 1-237-459-11 | RES, ADJ, CARBON 10K | |
| RV232 | 1-237-456-11 | RES, ADJ, CARBON 1K | |
| RV251 | 1-237-459-11 | RES, ADJ, CARBON 10K | |
| RV301 | 1-237-462-11 | RES, ADJ, CARBON 100K | |
| RV302 | 1-237-462-11 | RES, ADJ, CARBON 100K | |
| RV402 | 1-237-459-11 | RES, ADJ, CARBON 10K | |
| | | < TRANSFORMER > | |
| T251 | 1-235-126-00 | ENCAPSULATED COMPONENT | |
| T252 | 1-404-845-11 | COIL, DISCRI (PRIMARY) | |
| T253 | 1-404-846-11 | COIL, DISCRI (SECONDARY) | |
| | | < TERMINAL > | |
| TM401 | 1-537-897-11 | TERMINAL BOARD, PUSH(ANTENNA) 2P(ANTENNA) | |
| | | < TEST PIN > | |
| * TP251 | 1-565-513-11 | PIN, CONNECTOR 2P | |
| | | < VIBRATOR > | |
| X801 | 1-579-900-21 | VIBRATOR, CRYSTAL (4.332MHz) | |
| | | MISCELLANEOUS | |
| ⚠18 | 1-575-651-21 | CORD, POWER | |
| FL701 | 1-517-177-21 | INDICATOR TUBE, FLUORESCENT | |
| ⚠PT901 | 1-423-525-11 | TRANSFORMER, POWER | |
| RV701 | 1-466-336-22 | ENCODER, ROTARY (TUNING/SELECT) | |
| | | ACCESSORIES & PACKING MATERIALS | |
| | 1-501-594-11 | ANTENNA (FM) | |
| | 1-501-761-41 | ANTENNA, LOOP | |
| | 1-590-925-31 | CORD, CONNECTION (AUDIO 100cm) | |
| | 3-798-043-11 | MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, PORTUGUESE) (AEP, IT) | |
| | 3-798-043-31 | MANUAL, INSTRUCTION (GERMAN, DUTCH, SWEDISH, ITALIAN) (AEP, IT) | |
| | 3-798-043-41 | MANUAL, INSTRUCTION (ENGLISH, RUSSIAN, POLISH) (EE) | |
| | 3-798-043-61 | MANUAL, INSTRUCTION (GERMAN) (G) | |
| * | 4-974-634-11 | INDIVIDUAL CARTON | |
| * | 4-974-636-01 | CUSHION | |

The components identified by ▮mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

9-960-256-11

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Consumer A&V Products Company
Home A&V Products Div.



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# ST-SA3ES

SONY

# SERVICE MANUAL

*AEP Model*

## SUPPLEMENT-1

**Subject : GOLD MODEL ADDITION**

(ENG-96008)

The Gold model is added.
In this SUPPLEMENT-1, only the differences compared with the Black model are mentioned.
As for not mentioned in this manual, refer to the previous issued service manual.

| Page | Ref No. | Black model | | | Gold model | | |
|---|---|---|---|---|---|---|---|
| | | Part No. | Description | Remark | Part No. | Description | Remark |
| | | | *** EXPLODED VIEWS *** | | | *** EXPLODED VIEWS *** | |
| 21 | 1 | 4-942-568-01 | EMBLEM (NO.5), SONY | | 4-942-568-21 | EMBLEM (NO.5), SONY | |
| | 2 | 4-970-683-51 | PANEL, FRONT | | 4-970-683-71 | PANEL, FRONT | |
| | 3 | 4-970-684-01 | KNOB (T) | | 4-970-684-11 | KNOB (T) | |
| | 4 | 4-917-460-01 | KNOB, POWER | | 4-917-460-51 | KNOB, POWER | |
| | 5 | 3-704-366-01 | SCREW (CASE) (M3X8) | | 3-704-366-71 | SCREW (CASE) | |
| | 6 | 4-974-321-11 | CASE | | * 4-974-321-51 | CASE | |
| | 9 | X-4946-076-1 | BASE ASSY (B/3), PANEL | | X-4947-487-1 | BASE ASSY (N/3), PANEL | |

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